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## Ham Radio as a Means of Disaster Management: Understanding Indian Scenario

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### Abstract

*Among many radio channels that are in place in private and public media platforms, ham radio is a special type of radio which is least discussed in radio communication and hence their potential role for disaster management remains unnoticed and outside mainstream social science analysis. Ham Although radio organizations exist in practically every nation on the planet, it was primarily seen as a mode of communication in a pre-digital environment. Indian society's ham radio clubs, with their excellent activities in the current millennium, appear to be the silent servers of society, transcending communities. This study attempts to highlight the untapped potential of Ham radio in Indian society, which may be used as an alternative communication channel during emergencies, as well as actual experiences of interacting with functioning Ham groups in India at the field level. The paper concludes by arguing that Ham radio is useful not as a mere radio channel for communication but for effective social service communication if their untapped potentials are tapped by the government with right earnestness.*

**Keywords:** ham radio, India, society, service, untapped potential

### Introduction

Ham radio is also a grey area in communication research as awareness, perception and popularity of role of Ham radio is low in the rank of available radio communication channels. Each licensed ham operator has a call sign that they have either been assigned or picked for themselves (referred to as a vanity call sign). A call sign is composed of two components: a prefix that at least identifies the nation that gave the call sign, and a suffix that is the unique identifier for each operator. Ham operators are essential for emergency communication during a disaster and its aftermath. The role of ham radio operators in India is taken up as a case in this paper to reflect on the crucial social role that it plays even remaining outside the mainstream media industry and academic limelight. The first two amateur radio operators in

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India were from Kolkata. Shri Amarendra Chandra Gooptu (2JK) and Shri Mukul Bose (2HQ) got their amateur radio operator's licence in 1921 in Kolkata. The amateur radio operators, both individually and collectively, make a great effort to offer selfless voluntary community service that transcends identity barriers, making them a genuine institutional representation of society's massification. This is in contrast to our time, where the ethos of commercialization and profit motive drives the competitive radio communication in modern Indian media, and government radio channels adhere to the fundamentals of information dissemination. Prior to independence, India's amateur radio sector was run by amateurs and adventurers at the individual level, primarily assisting municipal governments. Following independence, the presence of political and social figures in the amateur radio communication sector helped make ham radio more well-known in Indian culture. A century after it first started operating in India, the perception of ham radio as an old-fashioned technological means of communication with the public is still a significant concern. Ham radio is proving that it is far from obsolete in the digital era by finding new uses, in addition to acting as an internet backup during harsh weather circumstances. The majority of ham radio users will admit that, despite recent advancements, radio is still less useful than the Internet or a modern mobile phone, but they contend that it continues to play a crucial role in education and emergency preparedness.

The nomenclature Ham conferred to amateur radio operators according to some scholars came from the first letter of three renowned radio scientists like Hertz, Armstrong and Macaroni. Across the world ham operators are present including United States of America, Japan, South Korea, Thailand, Canada, Germany, United Kingdom, Sweden, Norway, India, and Bangladesh. The thumb rule is that ham operators can never have any profit motive. Voice reduced through text signals using Morse code creates a kind of two-way communication which makes amateur radio unique than ordinary radio communication which is a one-way communication. The advantage of amateur radio communication is that it can establish connection with anyone across the world provided the persons involved are licensed and are present in the network-spectrum at the same time. Ham radio signals are present in every country of the world which are used not only for chatting but also for amateur satellite, amateur television, slow scan TV, Fast scan TV, Data transmissions. At the same time during natural disasters, emergency situations and manmade disasters, when mainstream communication gets destabilised, ham radio emerges as the only source of communication. It is seen that during disasters existing communication system breaks down due to overload in communication

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system and emergency service developers cannot connect with each other and in such a vacuum of communication, ham radio operators come as saviours. In the midst of terrorist attack of September 2001 in United States, it was the ham operators that kept the communication line active and in 2013 during the cyclone Hurricane and flood in Colorado river the ham operators helped the rescue operation to a large extent.

### **Literature Review**

In *The World of Ham Radio, 1901-1950: A Social History*, Richard A. Barlett (2015) reveals that, in addition to being a pastime, ham radio operators needed to comprehend radio theory, be able to trace a schematic, and know how to construct a transmitter and receiver using whatever materials they might have. This book also shows how, in the United States following World War II, ham radio operators, especially those in relay form (American Radio Relay League), became interested in helping the government manage crises like floods. Social entrepreneurship, which piques the interest of ham radio operators, is the independent variable in this book. This book only covers American experiences up until 1950 and is set in a specific time period. In "Citizen Radio Science: An Analysis of Amateur Radio Transmissions with e-POP RRI," G. The W. According to Perry et al. (2018), ham radio transmissions are a useful instrument for researching radio wave propagation and to an extent sensing the satellite domain taking case of Ham operators of American Radio League between 2015 and 2017. The citizen scientists are emphasised in this work but the service aspect of Ham radio is not reflected as it deals primarily with creations of new transmission wave-zones.

*A Guide to Ham Radio* by Sandeep Baruah (2000) published by Vigyan Prasar, Government of India in 2000 gives a detailed summary of evolution, rules and regulations and activities of Ham radio in India. Indian scholars, Santu Sikdar and Avinash Gour (2019) in an article titled 'A Study of Amateur Radio Innovations for Disaster Medicine' argues that because Amateur Radio is inexpensive, always available, and sufficiently independent of terrestrial telecommunications infrastructure, it has often augmented telecommunications capabilities of medical facilities. R. Rajendran et al (2019) in an article titled 'Farmers Interaction with Researchers through Ham Radio Network in Tamil Nadu, India – An Analysis' reveals that combination of Ham and audio cassette serves a wide range of teaching and learning tools, being simple, the most accessible, the most affordable and the most appropriate technology for economically, educationally and spatially disadvantaged, rural, resource-poor, farming

communities. Ham Radio networking is the independent variable but other facilities of Ham radio in society are not dealt in this work. Book by S. Suri (2019) titled *All About Ham Radio* and Untapped Potential of Ham radio (2022) vividly describes the emergence, modalities, practitioners and usage of Ham radio in Indian setting. The books highlight diligence and perseverance of ham radio operations as the independent variable. However, the books methodically are not based on field level research of role of ham radio communications in any state in India. The book is a general comment on everything one needs to know about the present status of ham radio in India.

### **Research Gap**

The literature review clearly reflects that books on ham radio are mostly about technical know-how and specific studies are limited to particular time period of 20<sup>th</sup> century or in general the comment on country wide experience. The literature of Ham radio also reflects a tilt towards western experiences even though by now ham radio is extremely popular and active in South Asian countries in general and in India in particular. A research gap is noticed about activities of hams in India, particularly about their efficiency quotient in disaster management.

### **Objective of the Study**

- a) To highlight main working areas of amateur radio organisations in different states of India.

### **Research Methodology**

The present research falls within the domain of qualitative research following interview and content analysis method to gather primary and secondary data. While primary data was gathered through case study method and interview method to identify and take up individual hams and ham organisations by interviewing through interview schedule and questionnaire. The secondary data was received from content analysis method of analysing basic texts, reports of ham radio organizations, government policy notes and newspaper reports.

**Findings and Analysis**

a) According to Indian Wireless Telegraphs (Amateur Services) Amendment Act, 1984, amateur services is a kind of service where anyone above twelve years after having necessary self-training and technological capacity can set any non-profit goal by following government rules and regulations can undertake the ham radio service. Some of the important initial Ham Radio clubs in India are as follows:

**Kerala Amateur Radio League:** The Kerala Amateur Radio League was the first institution in the world to provide distance learning programs in preparation for the ASOC exams. KARL is a nonprofit group that was established in 1980 with the goal of advancing amateur radio.

**Amateur Radio Association:** The Amateur Radio Association is another well-known organization in India that provides technical support to newly licensed hams. Dr. Ashotosh Singh, VU2IF, is the founder of this group (VU2ARD). The Indian government sent him to Antarctica in 1983–1984, making him the first Indian ham ever to go there. His organization manufactures tools and journals that support professional standards. SPARK is the name of his ham radio magazine. Without a doubt, beginners may anticipate receiving technical support from this club after getting a ham license. The well-known ATS-1 transceiver, which is primarily intended for voice and Morse code communication on the 20m short wave band, was created by Dr. Ashotosh (VU2IF).

**Amateur Radio Society of India Club Call sign Vu2zh:** A public service organization licensed under the Indian Societies Registration Act, the Association for Radio Communications and Information (ARSI) is the only national amateur radio association for Indian radio operators recognized by the IARU. Its mission is to advance Indian amateur music interests in various global locations. Providing essential service to the country and its members by maintaining vital communication during any crisis, whether it be national or international.

Society for the Promotion of Amateur Radio: Another active group that paved the way for several initiatives to increase the popularity of ham radio is the Cochin-based Society for the Promotion of Amateur Radio. "Zero-Beat" is the name of their journal.

**Bharat Scouts and Guides Headquarter**

The Delhi-based headquarters of the Bharat Scouts and Guides is also essential to the organization since it trains its members and hosts the Jamboree-On-The-Air (JOTA). Children from all over the world may communicate over the air via ham radio at this annual international event.

**Bangalore Amateur Radio Club:** One of the other well-known amateur radio clubs in India is the Bangalore Amateur Radio Club (BARC). One of the most popular clubs in the nation, it provides different kinds of assistance to both novice and seasoned ham radio operators, and it also publishes a monthly newsletter. The club was founded in 1959. Before India gained independence, amateur radio was operated mostly by individuals in a casual and experimental way, often assisting local authorities. After independence, the involvement of influential political and social figures in amateur radio communication helped make it more widespread in Indian society. Those who were knowledgeable in physics and telecommunications, particularly in mapping frequencies, were at the forefront of ham radio operation. However, up until the 1980s, ham radio operators mostly worked independently at a local level, primarily sharing information with citizens on behalf of the government during disaster management efforts. When India's economy opened up to the global market, the experiences of how ham radio functioned in Western societies began to expand the outlook and objectives of ham radio operators in India.

**b)** As the 21st century began, ham radio operations in India started to shift their focus towards aiding civic administration, not just in disaster management but also in handling other kinds of emergencies. Consequently, trained ham radio operators became widespread across Indian states. Their purpose was to connect citizens with the administration during natural disasters when regular communication channels fail, and also to link citizens in case of any mishap.

Government of India has a dedicated website for Ham radio called Vigyan Prasar where a state wise data base of Ham operator is enlisted. Chief Scientific Officer entrusted with Ham radio Mr. Barua reflects the eagerness of the Govt to promote ham radio operational and activities.

All regulation and rules pertaining to ham radio are there in WPC wing of Vigyan Prasar. The Indian Wireless Telegraph (Amateur Service) Amendment Rules 2009 is presently the regulatory principles to be followed by Ham Radio in India. The regulatory body for Ham activities is the Department of Telecommunications' Wireless Planning and Coordination (WPC) Wing of the Indian government.

A nodal body, the National Institute of Ham Radio (NIAR) in Hyderabad, is responsible for implementing public awareness of ham radio using government funding. It publishes a quarterly news magazine called Ham News, which covers ham events all around the nation. Major NIAR officials are S Rammohan and S Suri.

The Indian Institute of Hams (IIH) in Bangalore, under the direction of S. Satyapal, established the Ham Action Force, which is unique in that it brings together young hams who have received virtual disaster communication training to handle emergency situations. IIH has played a key role in offering essential information during natural catastrophes, such as the Gujarat Earthquake, the Tsunami, the Uttarakhand floods, the Orissa Super Cyclone, the Udyan Train accident (Yelahanka, Bengaluru), the Chennai floods, etc. IIH is linked to the Karnataka Civil Defense Organization, which falls under the jurisdiction of the Indian government's Ministry of Home Affairs and the government of Karnataka. IIH has also established a uniformed HAM ACTION FORCE (HAF) of committed, service-minded volunteers to maintain a critical communication network during natural catastrophes and disasters. The Institute is able to manage and deliver communication network to the country at any time.

The Bengal Amateur Radio Society, often called BARS, is essentially the parent group for Ham Radio in West Bengal. It first got going in 1966 but stopped working around 1990. Because of this, a lot of the members went off and started their own Ham Radio groups. Things picked up again in 2012 when BARS became active once more and started working with ARCCS. They offer hands-on training to students, like scouts, in disaster management, teaming up with different NSS groups. BARS also shares an office with the Assembly of God Church School in Kolkata, focusing on emergency services. They even put on an All India HamFest in Kolkata in 2018 and 2019. What's cool is that these organizations team up to go on expeditions to different out-of-the-way spots in the state and the country for something called Fox hunting practice.

The West Bengal Radio Club, or WBRC, has gotten national recognition for how they've helped find missing people using their radio network. The Kolkata police have mentioned that during big disasters, their wireless department sets up special stations where WBRC ham radio operators join in to use their high-frequency communication systems. The ham operators volunteer their services to the Kolkata police.

Right before the lockdown started, OSCAR India had just formed as an organization and had already built up a trained team across the country, especially in West Bengal, Uttar Pradesh, and Tripura. They have a YouTube channel where they regularly post webinars, discussions, and educational videos. The goal is to help everyday folks understand how Ham Radio works, both in practice and in theory, and why it's still relevant today. OSCAR India really emphasizes building a nationwide network and connecting with Ham operators all over India.

The Bengal Ham Radio Institute, which you can find online at [bhri.in](http://bhri.in), is located at 12, Aikyatan Pally, Bisharpara, Birati, Kolkata 700051. Led by VU2EVN, they're mainly focused on research and development, particularly on how to build high-capacity antennas for Ham Radio. BHRI also holds special classes in schools in North 24 Parganas to raise awareness. BHRI is all about getting students interested in the technical side of Ham Radio. They really make an effort to connect with experts in building antennas and getting radio sets ready all over the country. During their get-togethers, BHRI always makes sure to chat about the technical stuff with their members.

The Amateur Radio Society of Assam (ARSA), in collaboration with the Assam Police Radio Organisation (APRO), offers training in technical trades in the domains of police wireless communications, electronics, telecommunications, information technology, and basic drill & discipline and musketry. The NIAR - APRO Amateur Radio Centre (VU2VKP), established by the National Institute of Amateur Radio (NIAR), Hyderabad, under the leadership of Shri P M Dastidar, IGP (Communication) and Director of Police (Commn.) Assam and Shri S. Suri, VU2MY, Chairman & Director, NIAR, Hyderabad, is a component of the Assam Police's Disaster Management programs.

c) Ham radio operators in the agricultural sector in rural areas assist in spreading information about various productivity and profitability experiences to farmers throughout the nation. The independent variable is the linkage role of ham radio in the agriculture industry, but the exclusivity associated with farming and ham radio somewhat diminishes its significance in other industries. Effective communication bridges the gap between communities and people affected by the tragedy and first responders, support networks, and relatives. A community's ability to recover is also significantly influenced by the quality of its communication. Modern technology and social media have opened up new avenues for disaster communication in today's society. Social networking platforms like Twitter, Facebook, and Instagram enable communication between friends, relatives, first responders, and aid and relief providers. Social media and other contemporary methods of communication, though, have their drawbacks. They may be impacted by disaster events like power outages or cellular service disruptions. A catastrophe is a significant interruption to the functioning of a community that is beyond its means to manage on its own. Disaster risk communication seeks to inform the public in advance of a catastrophe, provide information during the disaster, aid in the recovery process, and lessen the harm caused by the disaster.

Ham radio operators acted as public communicators and helped the administration during the Fani cyclone in Odisha. The fact that women ham radio operators are particularly active in India demonstrates how women Hams are addressing women's issues outside of typical Ham activities. The West Bengal Radio Club was given permission to operate in the Sunderbans, where communication is always crucial, by the Election Commission. This novel radio station will deliver hourly reports to field officers and returning officers in voice and internet shadow zones on election day. In West Bengal, the disaster management role of Ham Radio was highlighted by recounting the experience of the West Bengal Radio Club's assistance to Ramkrishna Kar, a citizen of Barasat town in North 24 Parganas district, who was unable to contact his family in the Bagbazar neighborhood of Sagar Island in South 24 Parganas district, which was completely cut off by the storm communication wise for two days after Amphan cyclone. In order to cover the shadow-zone polling places made possible by the very high frequency (VHF) networks of Tripura Police and the amateur radio networks (HAM Radio) of Tripura Disaster Management Authority, election officials in Tripura employ ham radio networks in areas where mobile networks are unavailable. Ham radio operators also learn how

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to construct the equipment necessary for their profession, including the radio itself and the antennas that will support it. The Election Commission requested the club's assistance in election-related communication in 31 regions of West Bengal where there was no mobile network coverage during the 2018 panchayat elections. Mountaineers also use ham radios to conduct mock drills with the Indian Army, Air Force, Navy, Post Guard, and National Disaster Response Force. The operational practice of Ham Radio is seen as an independent variable, but it is still based on a basic interview of one Ham in the state.

### **Discussion**

As per the different activities of Ham organisations across the country, the following issue areas can be seen as untapped potential of Amateur Radio communication system's role in the current communication system in Indian society:

(A) Emergency response and disaster management on its website (<https://www.iacdm.com/>), the Indian Academy of Communication and Disaster Management showcases in great detail the numerous instances of disasters where Hams maintained communication lines throughout West Bengal and other areas of the nation. Their communication channels stay secure because their toolkits are powered by solar energy in addition to other backup technicalities.

(B) Incident Management: Amateur radio clubs help municipal and law enforcement authorities locate missing individuals and reunite them with their families.

(C) Supporting the Detective Department – Ham operators are trained in the "Fox Hunt" method, which is used to locate radio transmitting equipment in a specific area that is still outside the radar of the Detective Department. Over the past ten years, these kinds of events have been reported in West Bengal and other regions of the nation.

(D) Assisting the Election Commission – The Election Commission of India has made use of amateur radio groups to help in 'shadow zones' where mobile networks are not accessible, notably during the 2019 Lok Sabha and 2021 State Assembly Elections, to stay in touch with polling officials.

(E) Promotional/Awareness Campaign - These organisations promote and makes youth aware about Ham radio in various schools and colleges by organising workshops and seminars.

## **Conclusion**

Prior to receiving their license, Ham (an amateur radio operator) must pass a test covering the fundamentals of radio circuits, radio spectrum allocation, transmitter antenna modalities, and the instruments necessary for successful communication dissemination. As a result, every Ham is still fiercely committed to coming up with innovative methods of technical progress that, on the one hand, keep up with the most recent advances in technology, but on the other hand, are also cost-effective and communication-efficient. The topics that keep Hams involved throughout the globe, and especially in many federal units of India, are simulated drills with coast guards to raise awareness of how to establish communication during cyclones, interaction with the civil and police administration to locate missing people, interaction with school and college students through awareness campaigns with boy and girl scouts to develop a scientific temperament toward creating new methods of communication, and the introduction of less expensive transmitters through ongoing research and development. The latest trend in Ham world is the development of echo link, a new communication channel specific to Ham which can be used to communicate among them when all other source of communication breaks down. Another trend is to integrate with civic and police administration mechanism to help manage missing persons find out and also to provide health communication. By highlighting the communication design of Ham radio in West Bengal, one finds avenue for democratic and equitable radio communication space filling any possible vacuum in management of public service of society in times of need. Particular emphasis on regional variation of Ham operation in India is an under-researched area particularly focussing on the 21<sup>st</sup> century experience when science and technology has reached sky heights but ethics and morality has ebbed down in society. It is important to understand how in our times of consumerism and corporatisation, citizen communication comes from within the citizen through radio communication of ham and to identify their ideology, motivation, vision and mission. Amateur radio or Ham radio as it is commonly known is generally believed to be an obsolete medium of communication with growing digitisation and technological breakthrough in the general media space of our time and hence most academic approach to radio communication is a linear approach from Ham radio to AM radio to FM radio signifying the phase wise evolution of radio communication in tune with technological advancement. Although hams do not provide commercial services like infotainment but they become the saviour of communication lines during emergency when all established communication channels breakdown. Hams make stopgap radio stations in the

affected areas, integrate with disaster management officials of government like National Disaster Relief Management (NDRF) and try to restore the radio communication channels. Presently WBRC members are engaged in preparing satellites for more faster communication irrespective of the vagaries of cloud, rainfall and cyclones so that it becomes very helpful for remote areas. WBRC members integrate themselves with state government, disaster management groups, evacuation operator groups, fire brigade and work together to manage any emergency situations arising in the state. Moreover, they have used their radio sets to communicate with fishermen who go for fishing in deep seas during sudden heavy storms and in the process reduce the chances of any harm to those fishermen.

The members of WBRC are working on building satellites to enable faster communication, no matter the weather conditions like clouds, rain, or cyclones, which will be a huge help for people in remote areas. WBRC Members integrate with the state government, disaster management groups, evacuation operation groups, fire brigade and work together to address any emergency situation arising in the state. In addition, they used their radio sets to communicate with fishermen who fish in deep waters during sudden storms, which reduced the likelihood of any harm to those fishermen. As WBRC activities over the past ten years reflect the emergency services provided by government departments such as medical units, fire brigades, police and disaster relief teams, all keep in touch with WBRC and use them in emergency situations to communicate with people. In recent years, during the Covid-induced blockade, WBRC members have been very active in maintaining communication channels between affected people, such as students and migrant workers from other States, and helping them reach out to their families. They also supported elderly people and others in medical emergencies by providing door-to-door medical services to provide oxygen tanks to the residences of patients affected by Covid. With access to a special frequency network, WBRC is reaching remote areas where existing communication networks are not available. As a voluntary organization, it has been engaged over the past ten years in finding missing people, mentally disabled people, and people who are separated from their families or groups during huge holy gatherings such as Gangasagar. The persons missing are mostly non-Bengali, who speak a different language not deciphered by the local police administration, and at this juncture the WBRC is useful as many multilingual people are voluntarily associated with their organization and, as hams, they get these people together with their families and friends. This

paper considers the ongoing work of Hams in West Bengal over the past 10 years, ranging from helping governments and non-governmental organizations to helping the Election Commission, from social services to disaster management. This document brings back Ham Radio as a contemporary and even strategic medium of radio communication with its continuous efforts to update and improve in accordance with technological advances in the preparation of radio antennas to capture signals even in remote locations to be effective in emergency disaster situations. By highlighting the communication design of Ham radio in West Bengal, one finds avenue for democratic and equitable radio communication space filling any possible vacuum in management of society assisting both government and non-government organisations in times of need. Particular emphasis on regional variation of Ham operation in India is an under-researched area particularly focussing on the 21<sup>st</sup> century experience when science and technology has reached sky heights but ethics and morality has ebbed down in society (Bonni and Monclus, 2015). While the specificity of cultural context (language, habit, custom and tradition, religion and identity) influencing operations of Ham will be looked at from cultural studies perspective, the entire set of communication pattern, message coding, decoding and disseminating format and communicational outreach of Ham creates its own discourse vis-a-vis mainstream radio communication system and the latest trend of community radio system is something a discourse analysis frame will help to find out. The emerging theoretical framework of peace research in media communication (Hoffman and Hawkins, 2015) can be linked up with Ham radio communication as reflected in its activity in Indian scenario that plays in maintaining social peace in multicultural society. In a crucial juncture of emerging emphasis on radio communication through Mann ki Baat programme of Prime Minister Narendra Modi, this paper humbly tries to fill a research gap in understanding role of Ham radio communication in society in contemporary India

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